

WOLFEChip: Wholly-Integrated Optofluidic Laser-Induced Fluorescence Electrophoresis Chip, Phase I

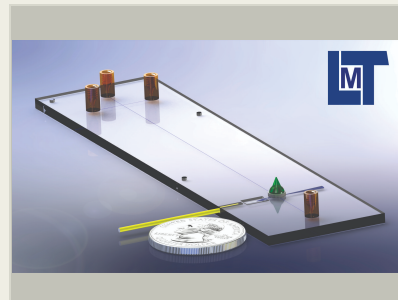
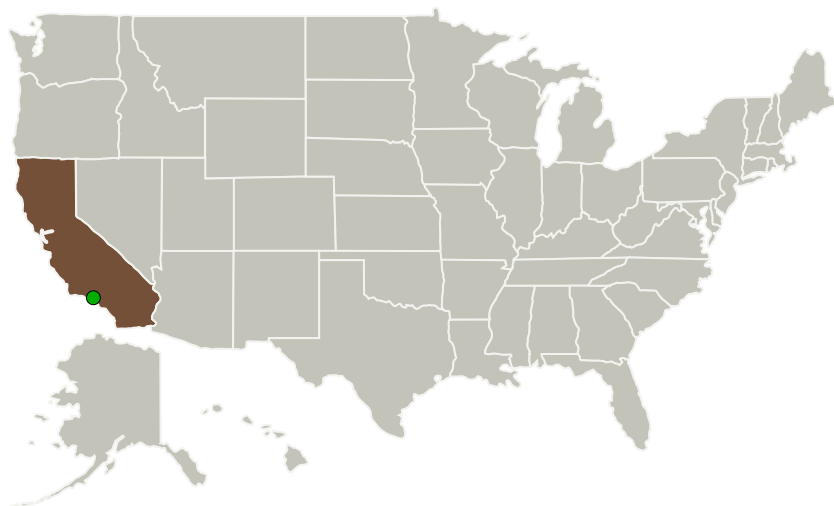
Completed Technology Project (2017 - 2017)



Project Introduction

In this Small Business Innovative Research (SBIR) effort, Leiden Measurement Technology LLC (LMT) proposes to design and build the Wholly-integrated Optofluidic Laser-induced Fluorescence Electrophoresis Chip (WOLFEChip), a microchip capillary electrophoresis (MCE) system using a miniaturized optofluidic approach for packaging all optical elements necessary for laser-induced fluorescence (LIF) on-chip. WOLFEChip uses cutting-edge laser micromachining to fabricate fully-three-dimensional optical elements that focus excitation laser light into a MCE microchannel to excite fluorescence. The fluorescence emission is collected using a heat-bonded lens on the backing layer. This improves on current and past implementations of MCE-LIF by (1) greatly miniaturizing the optical elements which comprise a significant amount of space in MCE-LIF systems; (2) making the entire LIF optical system monolithic and immune to misalignment which greatly enhances the vibration-resistance of the entire system; (3) making the system immune to operator-to-operator variations caused by the periodic need to carefully align traditional MCE-LIF systems; and (4) greatly reducing measured stray light and thereby potentially increasing the signal-to-noise ratio (SNR) of the MCE-LIF system by employing right-angle excitation/emission optical geometries and through the use of high-quality fluorescence-free fused silica.

Primary U.S. Work Locations and Key Partners



WOLFEChip: Wholly-integrated Optofluidic Laser-induced Fluorescence Electrophoresis Chip, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Leiden Measurement Technology, LLC	Lead Organization	Industry	Sunnyvale, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/136582>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Leiden Measurement Technology, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

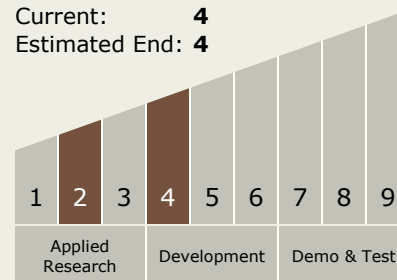
Carlos Torrez

Principal Investigator:

Nathan E Bramall

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers